

C5
ent. [, and whereby said information remains available after at least one of (a) loss of power, (b) loss of storage, or (c) immediate failure of at least a portion of said memory].

REMARKS:

Claims 15 to 55 are in the application, with claims 15 to 18, 23 to 26, 31 to 34, 39 to 42, and 47 to 55 having been amended. Claims 15, 23, 31, 39 and 47 to 55 are the independent claims herein. Reconsideration and further examination are respectfully requested.

The Invention

The invention generally concerns various techniques for storing, deleting, and/or retrieving network objects from a cache memory including mass storage in a network cache so as to improve operation of the network cache.

Section 112 Rejection

Claim 23 was rejected under 35 U.S.C. § 112, second paragraph, for alleged indefiniteness. In particular, the Office Action indicated that the terms "temporal locality" and "spatial locality" recited by claim 23 were vague. Applicants respectfully submit that nothing whatsoever is vague about these two terms.

In more detail, claim 23 as amended recites "optimizing (a) spatial locality of storage of network objects within said mass storage, and (b) temporal locality of retrieval of said

network objects.” Optimizing spatial locality of storage of network objects simply refers to optimizing a spatial position where network objects are stored. Optimizing temporal locality of retrieving network objects likewise refers to optimizing how the network objects are stored such that a timing of retrieving the network objects is optimized. Page 31, lines 1 to 21, of the application provides examples and techniques for optimizing spatial and temporal locality according to the invention.

For at least the foregoing reasons, reconsideration and withdrawal are respectfully requested of the § 112 rejection of claim 23.

Art Rejections:

The art rejections of each of the independent claims and their corresponding dependent claims are discussed in detail below.

Claims 15 to 22:

Claims 15 to 22 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,852,717 (Bhide).

Amended claim 15 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 15, the step of maintaining substantially minimizes a time required for the network cache to retrieve a network object from the cache memory.

The applied Bhide reference is not seen to disclose or to suggest the foregoing features of amended claim 15, at least with respect to a step of maintaining network objects in a network cache so as to minimize a time required for a network cache to retrieve a network object from a cache memory.

In more detail, the portion of Bhide cited against claim 15 in the Office Action, namely column 7, lines 48 to 50 of Bhide, concerns reducing a time required to retrieve an object by avoiding "one round-trip time between [Bhide's] agent and [Bhide's] server." This feature of Bhide is not understood to be concerned with minimizing a time required for a network cache to retrieve an object from a cache memory. Rather, this portion of Bhide is understood to be concerned with a benefit of retrieving an object from a cache maintained by network access equipment as opposed to retrieving the object from a server.

In addition, Applicants respectfully suggest that the Office Action has applied an incorrect standard in the rejection of claim 15. The Office Action has rejected claim 15 because the cited reference allegedly is "able" to perform the operations recited by claim 15. However, simply because a reference is "able" to perform features recited by a claim does not mean that the reference renders the claim obvious.

For example, any general purpose computer is generally able to perform the operations of any computer-implemented invention. However, all computer-implemented inventions are not rendered obvious by the disclosure of a general purpose computer.

Instead, as set forth at M.P.E.P. § 2143, all claim limitation must actually be taught by the applied reference(s). Furthermore, the reference(s) themselves must provide

motivation for combining the references in the manner set forth in the claim. These requirements prohibit reconstruction of an invention through use of impermissible hindsight, which is exactly what occurs when an invention is rejected because a device disclosed by a reference is merely “able” to perform recited operations. Accordingly, the rejection of claim 15 set forth in the Office Action is believed to be legally deficient.

For at least the foregoing reasons, withdrawal is respectfully requested of the § 103 rejection of claim 15 and claims 16 to 22 that depend therefrom.

Claims 23 to 30:

Claims 23 to 30 were rejected under § 103(a) over Bhide.

Amended claim 23 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 23, the step of maintaining includes steps of optimizing in the mass storage (a) spatial locality of storage of network objects within the mass storage, and (b) temporal locality of retrieval of the network objects from the mass storage.

The applied Bhide reference is not seen to disclose or to suggest the foregoing features of claim 23, at least with respect to a step of maintaining that includes steps of optimizing in the mass storage (a) spatial locality of storage of network objects within the mass storage, and (b) temporal locality of retrieval of the network objects from the mass storage.

In this regard, the Office Action makes a leap from Bhide's feature of reducing an overall time between a client and a server to claim 23's step of maintaining in mass storage that is optimized. In particular, the Office Action at page 4 indicates that Bhide's reduction in overall time means that Bhide reduces a time for locating objects in a cache memory.

However, as is clear from the very portion of Bhide cited in the Office Action, namely column 7, lines 48 to 50, Bhide's reduction in time is a result of avoiding "one round-trip time between [Bhide's] client and [Bhide's] server." Thus, Bhide's reduction in time is not understood to be at all related to the techniques used by Bhide in maintaining cached objects in its network access equipment, but rather to the fact that cached objects are maintained in Bhide's network access equipment. In fact, Bhide is not seen to explain in detail exactly how Bhide's agent maintains cached objects in Bhide's network access equipment.

While Bhide's agent might be fully capable of maintaining objects in a cache memory in a manner as set forth by claim 23, Bhide is not seen to disclose or even to suggest maintaining objects in this manner. In particular, Bhide is not seen to disclose or to suggest maintaining objects so as to optimize in mass storage (a) spatial locality of storage of network objects within the mass storage, and (b) temporal locality of retrieval of the network objects from the mass storage, as recited by claim 23.

Again, Applicants respectfully point out that the mere ability of a device described by a reference to perform in a claimed manner is not sufficient to render the claim obvious. Instead, the claimed features and operations must be taught by an applied reference.

For at least the foregoing reasons, withdrawal is respectfully requested of the § 103 rejection of claim 23 and claims 24 to 30 that depend therefrom.

Claims 31 to 38:

Claims 31 to 38 were rejected under § 103(a) over Bhide.

Amended claim 31 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 31, the step of maintaining includes steps of determining when and where on the mass storage to record the network objects so as to improve efficiency of maintaining or serving the network objects.

The applied Bhide reference is not seen to disclose or to suggest the foregoing features of claim 31, at least with respect to a step of maintaining includes steps of determining when and where on the mass storage to record the network objects.

At least because Bhide is not seen to explain in detail exactly how Bhide's agent maintains cached objects in Bhide's network access equipment, Bhide is not understood to disclose or to suggest claim 31's step of determining when and where on mass storage to record network objects. Accordingly, withdrawal is respectfully requested of the § 103(a) rejection of claim 31 and claims 32 to 28 that depend therefrom.

Claims 39 to 46:

Claims 39 to 45 were rejected under § 103(a) over Bhide.

Amended claim 39 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 39, the step of maintaining includes steps of recording the network objects in the cache memory and retrieving the network objects from the cache memory, so as to perform at least one of: minimizing a rate at which the network objects can be written to the mass storage, maximizing a rate at which the network objects can be erased from the mass storage, maximizing a rate at which the network objects can be retrieved from the mass storage, or minimizing a time required for retrieving the network objects from the mass storage.

The applied Bhide reference is not seen to disclose or to suggest the foregoing features of claim 39, at least with respect to recording the network objects in the cache memory and retrieving the network objects from the cache memory, so as to perform at least one of: minimizing a rate at which the network objects can be written to the mass storage, maximizing a rate at which the network objects can be erased from the mass storage, maximizing a rate at which the network objects can be retrieved from the mass storage, or minimizing a time required for retrieving the network objects from the mass storage.

Again, as is clear from the very portion of Bhide cited in the Office Action, namely column 7, lines 48 to 50, Bhide's reduction in time is a result of avoiding "one round-trip time between [Bhide's] client and [Bhide's] server." Thus, Bhide's reduction in time is not

understood to be at all related to the techniques used by Bhide in maintaining cached objects in its network access equipment, but rather to the fact that cached objects are maintained in Bhide's network access equipment. In fact, Bhide is not seen to explain in detail exactly how Bhide's agent maintains cached objects in Bhide's network access equipment.

While Bhide's agent might be fully capable of maintaining objects in a cache memory in a manner as set forth by claim 39, Bhide is not seen to disclose or even to suggest maintaining objects in this manner. In particular, Bhide is not seen to disclose or to suggest claim 39's feature of recording the network objects in the cache memory and retrieving the network objects from the cache memory, so as to perform at least one of: minimizing a rate at which the network objects can be written to the mass storage, maximizing a rate at which the network objects can be erased from the mass storage, maximizing a rate at which the network objects can be retrieved from the mass storage, or minimizing a time required for retrieving the network objects from the mass storage.

For at least the foregoing reasons, withdrawal is respectfully requested of the § 103(a) rejection of claim 39 and claims 40 to 46 that depend therefrom.

Claim 47:

Claim 47 was rejected under § 103(a) over Bhide.

Amended claim 47 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In

claim 47, the step of maintaining is performed independently of a file system for the mass storage of the cache memory.

In this regard, page 7 of the Office Action explains how Bhide's agent is independent of a client and a server, and therefore maintains its cache independent of a file system for the client and the server. However, amended claim 47 recites that maintenance of objects in the cache memory is independent of a file system for mass storage of the cache memory. Independence from a file system of a cache memory, if one exists, is entirely different from independence from a file system for a client or a server. Accordingly, withdrawal is respectfully requested of the § 103(a) rejection of claim 47.

Claim 48:

Claim 48 was rejected under § 103(a) over Bhide in view of U.S. Patent No. 6,009,466 (Axberg).

Amended claim 48 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 48, the step of maintaining includes steps of selecting a group of more than one the network objects to be written to the mass storage collectively, and writing the group of network objects to the mass storage in one or more write episodes.

The applied art, alone or in combination, is not seen to disclose or to suggest the foregoing feature of claim 48, at least with respect to selecting a group of more than one the

network objects to be written to the mass storage collectively, and writing the group of network objects to the mass storage in one or more write episodes.

In more detail, Axberg at column 5, lines 21 to 23, column 11, lines 1 to 25 and 54 to 58, Fig. 9 and Fig. 12A to 12E was cited for teaching this feature. However, according to Applicants' understanding, the "objects" referred to by Axberg are managed objects representing physical disks, controllers, logical disks, hosts, devices, connections and busses (see, e.g., column 8, lines 1 to 4). These objects utilized by Axberg are not understood to be the same types of objects utilized by the invention, such as the data objects described by the application at page 15, lines 16 to 22. For example, storing Axberg's managed objects in a network cache as claimed simply does not make sense to Applicants.

Accordingly, Axberg is not understood to disclose or to suggest claim 48's feature of selecting a group of more than one of the invention's network objects to be written to the mass storage collectively, and writing the group of the invention's network objects to the mass storage in one or more write episodes. Withdrawal of the § 103(a) rejection of claim 48 is therefore respectfully requested.

Claim 49:

Claim 49 was rejected under § 103(a) over Bhide in view of Axberg.

Amended claim 49 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In

claim 49, the step of maintaining includes steps of writing a group of network objects to the mass storage in one or more write episodes, such that efficiency of maintaining or serving the network objects is improved.

Again, the objects recited by Axberg are not understood to be equivalent to the objects recited by claim 49. Accordingly, withdrawal is respectfully requested of the § 103(a) rejection of claim 49.

Claim 50:

Claim 50 was rejected under § 103(a) over Bhide in view of Axberg.

Amended claim 50 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 50, the step of maintaining includes steps of selecting a group of more than one of the network objects to be deleted from the mass storage collectively, and deleting the group of network objects to the mass storage in one or more delete episodes.

Again, the objects recited by Axberg are not understood to be equivalent to the objects recited by claim 50. Accordingly, withdrawal is respectfully requested of the § 103(a) rejection of claim 50.

Claim 51:

Claim 51 was rejected under § 103(a) over Bhide in view of Axberg.

Amended claim 51 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 51, the step of maintaining includes steps of deleting a group of network objects from the mass storage in one or more delete episodes, such that efficiency of maintaining or serving the network objects is improved.

Again, the objects recited by Axberg are not understood to be equivalent to the objects recited by claim 51. Accordingly, withdrawal is respectfully requested of the § 103(a) rejection of claim 51.

Claim 52:

Claim 52 was rejected under § 103(a) over Bhide.

Amended claim 52 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 52, the cache memory utilizes non-hierarchical storage.

Claim 52 has been significantly amended to recite that a cache memory utilizes non-hierarchical storage. This feature is not believed to be disclosed or suggested by the applied art. Accordingly, allowance of claim 52 is respectfully requested.

Claim 53:

Claim 53 was rejected under § 103(a) over Bhide.

Amended claim 53 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 53, the step of maintaining includes steps of recording the network objects in the memory and retrieving the network objects from the memory, without having to maintain the network objects persistently.

In rejecting claim 53, the Office Action apparently has read the feature of “without having to maintain the network objects persistently” to mean that the network objects are not maintained in ROM. However, persistent memory includes memory such as static RAM, a hard drive that persists when power is turned off or removed, and the like. Thus, claim 53 concerns caching of network objects in which the objects are recorded and retrieved without having to be stored persistently such as in ROM, static RAM, or a hard drive.

At least because Bhide is not seen to teach exactly how its cache is stored and maintained in memory in its network access equipment, Bhide is not seen to disclose or to suggest this feature of claim 53. Accordingly, withdrawal is respectfully requested of the § 103(a) rejection of claim 53.

Claim 54:

Claim 54 was rejected under § 103(a) over Bhide in view of U.S. Patent No. 5,778,168 (Fuller).

Amended claim 54 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 54, the step of maintaining includes a step of writing a group of network objects to the mass storage in one or more write episodes, such that the write episodes are performed so as to atomically commit changes to the mass storage during each write episode by writing modified data and control blocks to the mass storage without erasing corresponding unmodified data and control blocks and then replacing a root node so as to atomically commit the changes.

The applied art, alone or in combination, is not seen to disclose or to suggest the foregoing features of claim 54, at least with respect to atomically committing changes by writing modified data and control blocks to the mass storage without erasing corresponding unmodified data and control blocks and then replacing a root node so as to atomically commit the changes. Accordingly, withdrawal is respectfully requested of the § 103(a) rejection of claim 54.

Claim 55:

Claim 55 was rejected under § 103(a) over Bhide in view of U.S. Patent No. 5,778,168 (Fuller).

Amended claim 55 recites a method including steps of receiving a set of network objects in response to a first request to a server from a client, and maintaining the network objects in a cache memory in a network cache, the cache memory including mass storage. In claim 55 the step of maintaining includes a step of deleting a group of network objects to the mass storage in one or more delete episodes, such that the delete episodes are performed so as to atomically commit changes to the mass storage during each delete episode by writing modified control blocks to the mass storage without erasing corresponding unmodified control blocks and then replacing a root node so as to atomically commit the changes.

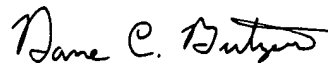
The applied art, alone or in combination, is not seen to disclose or to suggest the foregoing features of claim 55, at least with respect to atomically committing changes by writing modified data and control blocks to the mass storage without erasing corresponding unmodified data and control blocks and then replacing a root node so as to atomically commit the changes. Accordingly, withdrawal is respectfully requested of the § 103(a) rejection of claim 55.

Closing

In view of the foregoing amendments and remarks, the entire application is believed to be in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney can be reached at (614) 855-9427. All correspondence should continue to be directed to the address indicated below.

Respectfully submitted,



Dated: July 12, 2000

Dane C. Butzer
Reg. No. 43,521

The Swernofsky Law Group
P.O. Box 390013
Mountain View, CA 94039-0013
(650) 947-0700